Small Business Innovation Research/Small Business Tech Transfer

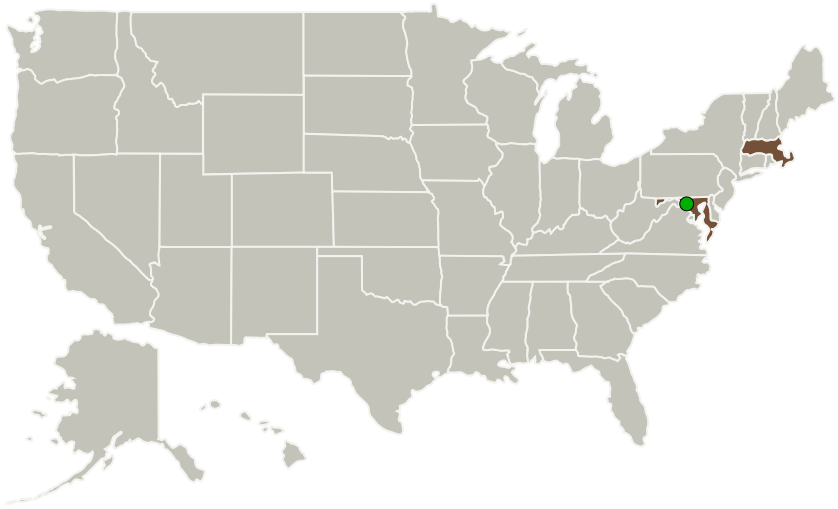
Cryomechanical Preconcentration System for Trace Gas Analysis, Phase I

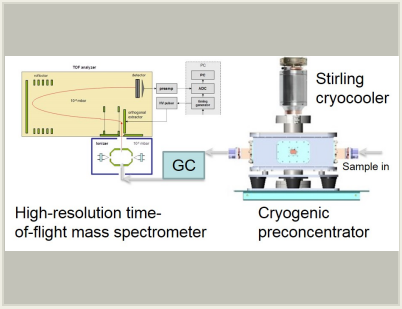
Completed Technology Project (2017 - 2017)

Project Introduction

Advanced cryogenic cooling systems are required to enable high-precision measurements of trace atmospheric gases and isotopes present at very low concentrations in order to evaluate anthropogenic impacts on climate and stratospheric ozone and to assess compliance with international regulations. This SBIR Phase I project will develop a robust cryogen-free preconcentrator based on a Stirling cryocooler and a novel sample trap design. A high resolution time-of-flight mass spectrometer will be coupled with gas chromatographic separation for selective and sensitive detection of greenhouse gases and ozone depleting substances. Data acquisition and analysis software will be developed to allow for automated operation of the instrument and data archiving. Combining these three elements will provide a new system capable of rapid automated analysis for field and laboratory measurements. In addition to these applications, the preconcentrator will be useful for enhancing the sensitivity of optical-based isotopic measurements for greenhouse gases.

Primary U.S. Work Locations and Key Partners





Cryomechanical preconcentration system for trace gas analysis, Phase I Briefing Chart Image

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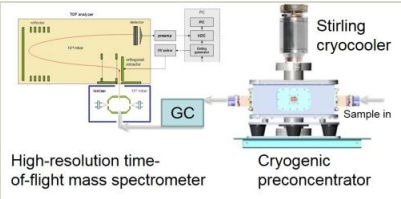
Organizations Performing Work	Role	Type	Location
Aerodyne Research, Inc	Lead Organization	Industry	Billerica, Massachusetts
Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
Maryland	Massachusetts

Images



Briefing Chart Image
Cryomechanical preconcentration system for trace gas analysis, Phase I Briefing Chart Image *(https://techport.nasa.gov/image/135233)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Aerodyne Research, Inc

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

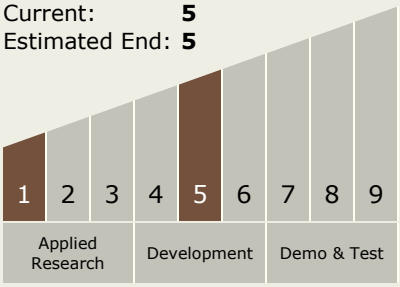
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Brian Lerner

Technology Maturity (TRL)

Start: **1**
Current: **5**
Estimated End: **5**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.3 In-Situ Instruments and Sensors
    - TX08.3.4 Environment Sensors